

AIR QUALITY ASSESSMENT
THUNDER BAY TERMINALS LIMITED
THUNDER BAY, 1985.

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Ministry
of the
Environment

W.M. Vrooman
Regional Director
Northwestern Region

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THUNDER BAY TERMINALS LIMITED
THUNDER BAY
1985

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TECHNICAL SUPPORT SECTION
NORTHWESTERN REGION
ONTARIO MINISTRY OF THE ENVIRONMENT

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INTRODUCTION

Since 1978, Thunder Bay Terminals Limited has operated a bulk storage and trans-shipment facility adjacent to Thunder Bay harbour. Air quality studies (including air monitoring, vegetation, soil and snow sampling) have shown that there has been no increase in dust levels off company property resulting from operations at the terminal. In 1985, the terminal processed nearly 3 million tons of coal, slightly more than 1 million tons of potash, and a small quantity of agricultural grains.

AIR QUALITY DATA

DUSTFALL

In 1985, monthly dustfall was measured at the six sites shown in Figure 1. Thunder Bay Terminals collected data at sites 1, 3, 6 and 7, while sites 9 and 10 were part of the Ministry's monitoring network.

Table 1 shows that at locations off company property (sites 1, 9, and 10), monthly dustfall exceeded Ontario's maximum acceptable limit of $7 \text{ g/m}^2/30 \text{ d}$ (grams of total dustfall per square metre during 30 days) during a three month period at site 1 (Sewage Treatment Plant) and for one month at site 10 (McKellar Hospital). There were no exceedences at site 9 (Kam Boating Club). The annual dustfall objective ($4.6 \text{ g/m}^2/30\text{d}$) was met at sites 9 and 10, and was slightly exceeded at site 1. There were frequent exceedences of the monthly objective at the three on-property monitoring locations, especially at site 6. Average annual dustfall did not meet the Ministry objective at these three sites. Road dust, coal dust, and insect parts usually accounted for the elevated readings at the three monitoring stations on Thunder Bay Terminals property.

At two of the three off-property sites (9 and 10), average dustfall in 1985 was essentially unchanged from the satisfactory levels found in preceding years (Table 2). At site 1, average dustfall increased from previous years. Two high readings, in July and August, caused the increase in annual average at this site. A soluble substance (identity unknown) accounted for the high readings.

TOTAL SUSPENDED PARTICULATE MATTER (TSP)

Particles of suspended particulate matter, being much smaller than dustfall particles, are suspended in the air for long periods. TSP at three locations at Thunder Bay Terminals was measured for a 24-hour period every sixth day during 1985, using a standard high-volume sampler. Table 3 shows that during 1985, TSP met the annual objective ($60 \mu\text{g}/\text{m}^3$) at all monitoring sites. There were five exceedences of the daily objective ($120 \mu\text{g}/\text{m}^3$) on company property (site 3), but no exceedences off-property (sites 1 and 10). Average TSP at the three sites was similar to values recorded for many of the nine preceding years (Table 4).

CONCLUSION

Average dust levels, measured as dustfall and total suspended particulate matter, continued to be recorded at generally acceptable concentrations around Thunder Bay Terminals property in 1985. Monitoring is being continued to ensure compliance with provincial air quality objectives.

ACKNOWLEDGEMENT

The Ministry thanks Thunder Bay Terminals Limited for providing data on wind, dustfall, and TSP from its monitoring network.

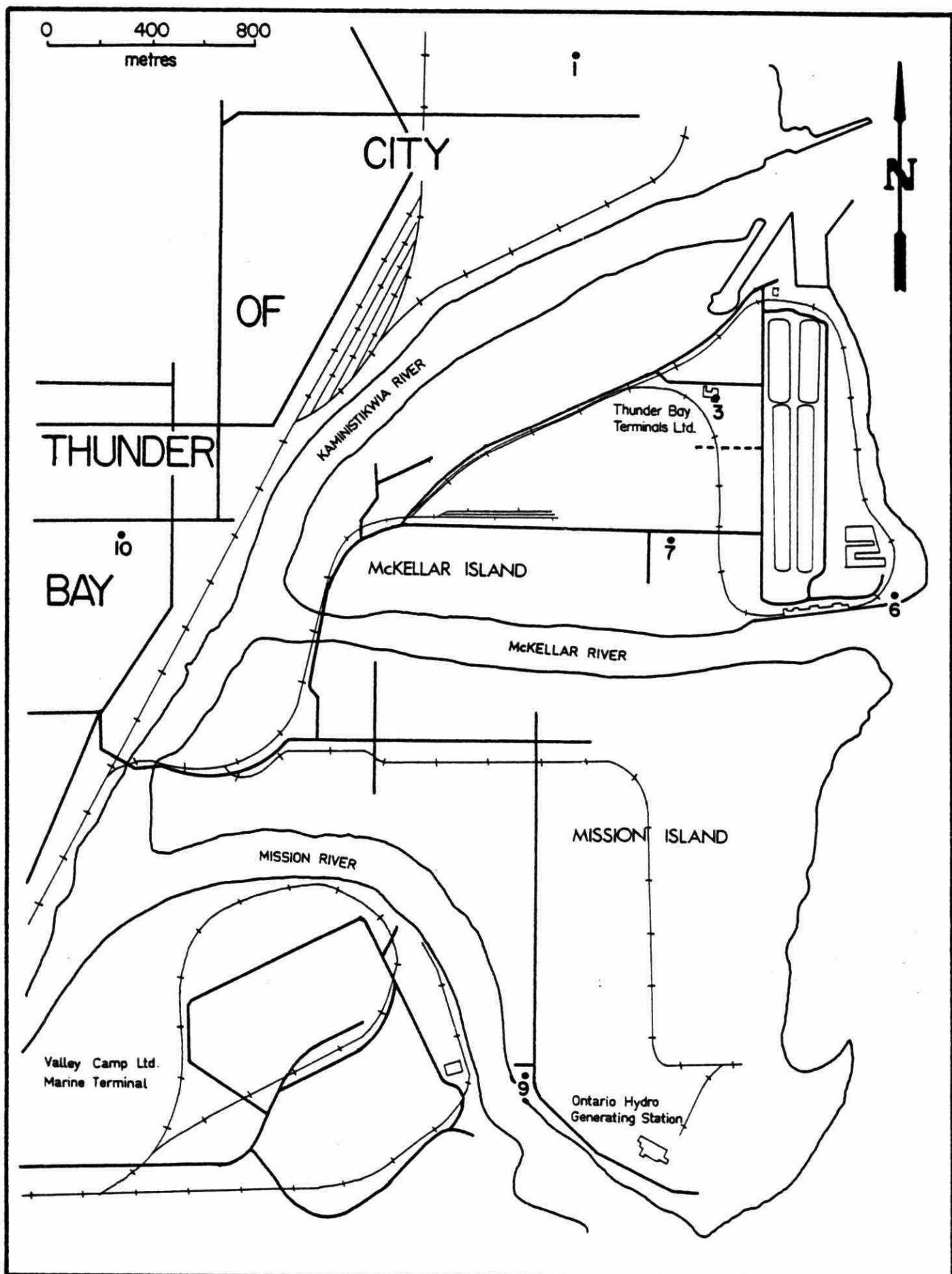


Figure I. Air quality monitoring sites , Thunder Bay Terminals , 1985.

TABLE 1. Total dustfall (g/m²/30 days) near Thunder Bay Terminals Limited, 1985.

Site	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1	Sewage Treatment Plant	4.3	2.1	3.3	3.7	4.9	7.1	<u>14.1</u>	<u>25.0</u>	5.2	2.4	0.7	0.5	<u>6.1</u>
3	Thunder Bay Terminals	2.2	3.6	6.1	<u>11.9</u>	<u>8.3</u>	7.6	<u>12.1</u>	<u>27.9</u>	<u>11.5</u>	2.9	1.6	1.3	<u>8.1</u>
6	Thunder Bay Terminals	<u>13.8</u>	<u>10.3</u>	<u>17.9</u>	<u>26.3</u>	4.7	<u>16.2</u>	<u>14.4</u>	<u>26.9</u>	<u>14.6</u>	1.4	1.0	<u>40.9</u>	<u>15.7</u>
7	Thunder Bay Terminals	2.2	2.7	3.2	<u>42.6</u>	4.1	5.4	2.0	<u>12.5</u>	<u>8.1</u>	1.8	0.9	0.4	<u>7.2</u>
9	Kam Boating Club	0.5	1.3	1.3	1.5	3.0	3.7	2.7	2.1	3.1	2.0	1.5	0.6	1.9
10	McKellar Hospital	-	2.0	4.8	6.4	5.1	<u>8.2</u>	3.5	3.6	2.0	3.7	2.4	0.8	3.9

^aValues exceeding maximum acceptable levels of 7.0 (monthly) or 4.6 (annual mean) are underlined.

TABLE 2. Average annual dustfall (g/m²/30 d) near Thunder Bay Terminals Limited, 1976-1985.

Monitoring site	Location	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1	Sewage Treatment Plant	3.2	4.4	3.2	2.8	2.5	2.1	2.8	3.4	3.6	<u>6.1</u> ^a
3	Thunder Bay Terminals	4.2	4.2	2.7	2.7	<u>5.2</u>	3.6	<u>4.7</u>	<u>8.2</u>	<u>5.0</u>	<u>8.1</u>
6	Thunder Bay Terminals					<u>8.5</u>	<u>6.9</u>	<u>8.8</u>	<u>19.5</u>	<u>15.3</u>	<u>15.7</u>
7	Thunder Bay Terminals					<u>7.9</u>	4.3	3.2	<u>16.1</u>	4.0	<u>7.2</u>
9	Kam Boating Club	<u>5.6</u>	4.6	4.3	4.2	2.5	2.1	3.4	1.7	2.1	1.9
10	McKellar Hospital	3.5	<u>5.0</u>	3.8	3.8	4.0	3.7	3.8	3.1	3.4	3.9

^aValues above maximum acceptable level of 4.6 are underlined.

TABLE 3. Concentrations of total suspended particulate matter ($\mu\text{g}/\text{m}^3$) near Thunder Bay Terminals Limited, 1985.

Monitoring sites ^a				Monitoring sites ^a			
Date	1	3	10	Date	1	3	10
Jan 1	23	21	17	Jul 6	29	16	38
7	22	14	16	12	77	<u>138</u>	82
13	-	46	40	18	24	<u>49</u>	49
19	20	32	18	24	57	51	63
25	15	16	16	30	43	84	56
31	55	78	-	Aug 5	89	32	39
Feb 6	39	28	25	11	7	37	21
12	18	18	-	17	20	38	34
18	52	40	27	23	12	<u>145</u>	42
24	12	4	12	29	28	<u>90</u>	41
Mar 2	17	28	51	Sep 4	17	23	29
8	49	57	50	10	45	53	37
14	6	35	50	16	87	119	63
20	41	<u>62</u> ^b	57	22	18	19	22
26	61	<u>126</u> ^b	79	28	18	28	20
Apr 1	21	56	69	Oct 4	22	21	29
7	28	35	34	10	43	36	35
13	11	29	15	16	25	17	27
19	42	84	61	22	78	<u>155</u>	84
25	18	29	23	28	27	<u>54</u>	41
May 1	57	<u>148</u>	80	Nov 3	14	28	18
7	32	<u>20</u>	38	9	30	44	39
13	46	92	62	15	17	21	62
19	28	28	-	21	25	2	27
25	26	92	29	27	32	25	21
31	24	79	33	Dec 3	46	92	37
Jun 6	58	109	57	9	10	19	26
12	54	74	71	15	26	28	25
18	47	37	41	21	3	5	43
24	38	-	39	27	-	14	15
30	95	22	44	Annual mean:	28	37	36

^aSee Figure 1.

^bValues above the 24-hour objective ($120 \mu\text{g}/\text{m}^3$) are underlined.

TABLE 4. Annual geometric means ($\mu\text{g}/\text{m}^3$) of total suspended particulate matter near Thunder Bay Terminals Limited, 1976-1985.

Monitoring site	Location	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1	Sewage Treatment Plant	41	31	27	30	28	31	28	27	38	28
3	Thunder Bay Terminals	47	33	34	33	33	39	32	42	59	37
10	McKellar Hospital	49	36	44	51	44	52	39	36	44	36

1988.1

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0.0

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0.1